

elliptical-lanceolate in outline; margins coarsely and regularly crenate or bluntly dentate; nervation strictly craspedodrome, the secondary nerves almost parallel, each one terminating in the apex of a marginal dentition; fruit apparently single, on a



FIG. 2. *Fagopsis longifolia* (Lesq.) Hollick. Nat. size showing mature fruit.

stout, short peduncle, somewhat ovoid in shape and covered with spinous bracts when immature; globose, rough, and apparently destitute of bracts when mature.

Tertiary shales, station 14, Florissant, Colo., June, 1907.

Figure 1, specimen collected by Mrs. T. D. A. Cockerell.

Figure 2, specimen collected by T. D. A. Cockerell.

Specimens in Museum N. Y. Bot. Gard.

NEW YORK BOTANICAL GARDEN

## THE RUST OF TIMOTHY\*

BY FRANK D. KERN

Timothy rust was reported from this country as early as 1881 or 1882 by Trelease in the Transactions of the Wisconsin Academy of Science † but it is only in very recent years that it has been found in sufficient abundance to attract much attention or to be the cause of any alarm. Except for this single report, rust on timothy has been so rare in this country that its previous existence might almost be questioned. In 1906 a fairly abundant amount was observed at one or two localities in New York, and in 1907 it was reported from Delaware, West Vir-

\* Read before the Indiana Academy of Science at the Thanksgiving meeting, Purdue University, November 27, 1908.

† Preliminary List of Wisconsin Fungi, Trans. Wis. Acad. Sci. 7: 131. 1885.

ginia, and New York again, and also from two localities in Ontario, Canada. In New York it was rather common, having been collected in eight or more localities in different parts of the state. 1908 has added Michigan to its list and Wisconsin has reported it again. It is seemingly increasing in its distribution and occurring in much greater abundance.

This spread of a fungous disease on a crop of great importance has caused some anxiety concerning its identity and nature. This has led to some investigation concerning it. In the first place the American and European forms are undoubtedly identical and represent the same species. In the gross appearance of the sori and in the microscopical details of both the summer spores (*urediniospores*) and winter spores (*teliospores*) the species is indistinguishable from the black rust of cereals, *Puccinia poculiformis* or *Puccinia graminis*, as it is better known. In 1894 Erikson and Henning separated the timothy rust as a distinct species, *Puccinia Phlei-pratensis*,\* on the grounds that their artificial cultures showed that it probably does not form its aecial stage on the barberry (*Berberis*). An examination of their original report shows, however, that out of nine trials (five in 1892, and four in 1893) while eight gave negative results, one gave a positive result showing pycnia in 16 days and developing aecia in 16 days more. It is noted that the cups formed were unusually small. During the present season eight unsuccessful inoculations on barberry were observed by the writer. Several seasons' experience with the cultures has shown that negative results are not always to be relied on; they may indicate lack of proper conditions or that infection does not take place readily. The one positive result mentioned ought, it seems, be accorded more weight than all the negative ones together, and proves that it does, even if with difficulty, form its aecial stage upon the barberry. The conclusion is that the timothy rust may be considered a race of *Puccinia poculiformis*, or a so-called physiological species, differing from the typical form in having somewhat smaller aecial cups and in the somewhat smaller size of

\* Die Hauptresultate einer neuen Untersuchung ueber die Getreideroste, II. Zeits. f. Pflanzenkr. 4: 140. 1894.

the hyphae of the uredinial mycelium as cytological studies have shown, but there is no positive evidence to show that it can be regarded as a distinct species.

Knowing the taxonomic relationship, it may be predicted with reasonable certainty that there is not much danger of the rust transferring to timothy from the other cereals and grasses. It may be expected to become more general in its distribution and may locally do considerable injury; but in spreading it will be limited, chiefly if not entirely, to passing in the summer spore (*uredinial*) stage from timothy to timothy.

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## ABERRANT SOCIETIES OF SANGUINARIA AND TRILLIUM

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Several years ago, in the course of biometric studies on some of our wild flowers, I determined the variation in the number of petals of *Sanguinaria Canadensis* L., the bloodroot, for several localities. One of these localities gave results so aberrant that it seems desirable to place it upon record.

The manuals give the number of petals as 8-12 but always figure it with 8 petals. Dr. Cheney, formerly of the University of Wisconsin, informs me that the modal number is eight in every one of the localities in which he has seen it in that state. The following table gives my results, with a count from Milwaukee, Wisconsin, for which I am indebted to Dr. P. H. Dernehl.

Place	Year	No.	6	7	8	9	10	11	12
Yonkers, N. Y.....	'99	102	0	0	18	18	16	25	24
Alpine, N. J.....	'99	171	3	2	165	1	0	0	0
Glencoe, Ill.....	'00	75	0	2	73	0	0	0	0
Milwaukee, Wis.....	'02	103	0	1	98	2	2	1	0
Stony Brook, Mass.....	'99	4	0	0	4	0	0	0	0
Blue Island, Ill.....	'00	8	0	0	8	0	0	0	0
Eagle Heights, Wis.....	'02	5	0	0	5	0	0	0	0

It is evident that in general any other number than 8 petals is a rarity. The society in Yonkers where the count was made is, therefore, a remarkably aberrant one, presenting a polygon of